Project Fact Sheet

Project 4.4 Slat-Array Concentrator Development (SMUD/ReGen)

GOALS

- Significantly improve the practicability of reflective optics by introducing the lens-like slat-array concentrator concept and developing it for uniform illumination of photovoltaic cells at moderate sunlight concentration.
- Develop and test a slat-array concentrating photovoltaic (CPV) prototype module with increased efficiency and reduced cost and operation.

PROJECT DESCRIPTION

The concentrating photovoltaic (CPV) is an emerging technology which appears to be the least expensive and most efficient of all photovoltaic technologies due to substituting a large fraction of expensive flat-plate PV panels with less expensive concentrators supplied by tracking systems. To fully exploit the advantages of CPV's and achieve relatively high concentration ratios, a number of approaches based on Fresnel lenses and parabolic mirrors have been devised. However, none of the existing solar concentrators provides desired operation at a reasonable cost thus limiting the acceptance of CPV technology.

This project promises a unique opportunity to naturally combine the robustness and high efficiency of the reflective optics and design conveniences of the Fresnel lens technology in a single and in expensive CPV device based on a novel slat-type concentrator concept.

The slat-array module developed in this project will consist of specially designed asymmetric linear concentrator and an array of concentrator silicon solar cells electrically interconnected and mounted on a single wafer. The concentrator will consist of a set of narrow reflective slats reflecting the solar energy to the line-arranged cells. Each reflective slat will have a specific concave profile in the cross section to provide light focusing capability.

BENEFITS TO CALIFORNIA

This project is a longer-term research project which supports the PIER Program objectives of developing a new generation of low-cost renewable technologies for tomorrow's electricity system.

FUNDING AMOUNT

Commission	$347,270
Match	$0

PROJECT STATUS

On-going. Contract began April, 2002.

FOR MORE INFORMATION

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